



CONVENTION ON WETLANDS
CONVENTION SUR LES ZONES HUMIDES
CONVENCIÓN SOBRE LOS HUMEDALES
(Ramsar, Iran, 1971)

**Economic trends in the mining sector and the implications for the
protection and wise use of wetlands**

Author: F H Brown MSc CPG PrSciNat
Email address: fhbpost@yahoo.com

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*The views and designations expressed in this paper are those of its author and do not
represent an officially adopted view of the Ramsar Convention, its Secretariat or its
Scientific and Technical Review Panel.*

Covering Note

By Dr. Heather MacKay,
Chair, STRP

Background and purpose of the paper “*Economic trends in the mining sector and the implications for protection and wise use of wetlands*”

Mr Abou Bamba, the SRA for Africa, raised this issue at the mid-term workshops of the STRP in March 2007, and indicated that Latin American as well as African CPs were asking for scientific and technical guidance related to the impacts of mining in and around wetlands. The STRP understood from this that the CPs were (and are) primarily requesting "best-practice guidance" related to assessment, mitigation and minimisation of mining impacts on wetland ecosystems.

At that time, our discussion centered around oil and gas exploration and exploitation, but it is clear from the overview document that all sectors of the mining industry, including precious metals, base metals, industrial minerals and coal, are expected to continue on rapid growth paths, leading to increasing potential for impacts on wetland ecosystems.

Following the STRP mid-term workshops, we have continued the discussion through the STRP Support Service, and also requested a briefing paper. The briefing paper was intended to provide the STRP with an overview of current and future trends in the mining/extraction sector, in order to understand to some degree the primary economic and technical drivers of investment and activity in that sector, and how this might affect wetlands in general, as well as specific Ramsar sites. This is in turn intended to help clarify the manner in which the STRP could potentially best provide scientific and technical support for CPs in addressing this sectoral issue.

The purpose of the attached paper is to share some of our recent discussion and the overview of economic trends in the mining sector with CPs. We hope that the technical information will be useful to the CPs, and we request feedback from them on what specific scientific/technical guidance might be needed from the STRP to assist them in addressing this issue. Such feedback will be most helpful as we develop recommendations for what (if any) appropriate tasks or initiatives might be proposed by the STRP in the future in relation to mining/extraction activities.

In the context of wise use, managing the impacts of mining/extraction activities in or near wetlands requires that three inter-connected factors should be addressed together:

1. Governance (due process, independence, transparency, robust regulatory environment, capacity for compliance enforcement);
2. Corporate social responsibility (mining company or entity engages willingly and in good faith with governance process);
3. Adequate scientific/technical information and knowledge base to support decision-making and later implementation:
 - a. Information related to wetland ecosystems (function, sensitivity, resilience; ecological, socio-economic & cultural **values**);
 - b. Information related to specific mining activities (social/economic/ecological/cultural impacts; mitigation and restoration options);
 - c. Information and general guidance on best practices.

While we recognize the importance of treating these three factors as an interconnected package, an important short term need is to improve the scientific and technical knowledge base in order for wetland ecosystems to be adequately considered in all phases of mining/extraction projects, and for the full range of wetland ecosystem services to be explicitly considered in cost-benefit analyses as part of planning, permitting, decision-making and mine site management processes.

Please note that the attached paper does not represent officially adopted views of the STRP, the Secretariat, the Standing Committee or the Ramsar Convention as a whole.

Dr. Heather MacKay
Chair, STRP

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1 Introduction

1.1 Background: wise use in the context of mining/extraction activities

The initial concerns which led to the preparation of this paper were focused on oil and gas exploitation and the potential impacts on wetlands in general, and Ramsar sites in particular. However, it is clear that all sectors of the mining industry are expected to continue on an increasingly rapid growth path, leading to increasing potential for impacts on wetland ecosystems as mining development and production increase. This paper therefore deals generally with economic trends in the mining/extraction sector, and hence is relevant for oil and gas, precious and base metals, coal and industrial minerals.

The Ramsar Convention defines wise use of wetlands as “the maintenance of their ecological character, achieved through the implementation of ecosystem approaches , within the context of sustainable development” (Ramsar Convention Secretariat, 2007) This recognizes that while some wetland development is inevitable and may have important benefits for society, decisions related to development in or near wetlands should be made through seeking an appropriate balance between the potential benefits of development and the costs to society, both quantitative and intangible, of potential loss or reduction of the ecological services and benefits provided by the wetland. In some cases, this may lead to a decision not to allow a particular type of development at all.

Ideally, the outcome of a decision-making process related to mining or extraction in or near a wetland should be consistent with the principle of wise use. That is, it should represent an acceptable balance between short and long term costs and benefits. This means that the decision-making process itself should be as well-informed as possible with credible, quantitative information. This will help to promote a balanced decision, one that clearly identifies the conditions under which mining may or may not proceed, and the responsibilities and requirements for mitigation, minimization or avoidance of negative environmental impacts at all phases of the project including post-closure and handover.

Managing the impacts of mining/extraction activities on wetlands in the context of wise use requires that three factors be considered and addressed in an integrated way, viz:

1. Governance systems and their associated decision-making and regulatory processes for permitting and site management;
2. Corporate social responsibility practices of members of the mining/extraction sector;
3. The provision of relevant, credible data and information related to the wetland ecosystems likely to be affected by mining/extraction activities, as well the full range of ecosystem services and benefits provided by those ecosystems.

1.2 Scope and content of this paper

While all of the three aspects mentioned above are necessary for implementing wise use, it is beyond the scope of this short paper to address any one of them in great detail. Specifically, this paper covers current and potential economic trends in the mining sector and the associated potential pressures on wetlands. The paper is intended as an information resource for Ramsar contracting parties, to support discussion at the Africa regional meeting.

Section 2 provides an overview of the economic drivers currently influencing the mining/extraction sector. Understanding these drivers provides better insights into how and where the likely pressures on wetlands will occur, and hence should support the development of proactive responses from the wetlands sector, particularly in engaging with decision-making processes related to EIAs and permitting of mining/extraction activities.

The economic overview in Section 2 shows that world commodity prices are high, demand is high and growing, and global stockpiles for many commodities are generally relatively low. As a result, timelines for moving from exploration to production are being greatly accelerated, and previously marginal deposits are now becoming economic to exploit. It is considered likely that this situation will continue for the foreseeable future. This means that time for EIA processes and decision-making is being reduced, leaving even less time for gathering ecological information and conducting wetland inventory and baseline studies in the areas potentially targeted for mining development.

Section 3 addresses the kinds of scientific and technical information and guidance that might be helpful in supporting the proactive engagement of the wetlands sector in decision-making processes related to mining/extraction activities. In particular, the importance of identifying priority areas for inventory and baseline data collection is emphasized, in order to increase the lead time for the wetlands sector in responding to the greatly shortened timeframe for moving from exploration to production in the mining sector.

It is recognized that a range of potential situations might arise involving mining/extraction activities, with varying impacts and implications for wise use of wetlands, and different requirements for response or input from the wetlands sector. These include:

- Historical mining/extraction activities currently in late production, closure, or post-closure phases
- Historical mining/extraction activities now in handover or post-handover phase
- Projects in commissioning/early production phases
- Projects in late exploration phases
- Projects in early exploration phases

Not all of these situations can be covered in detail in this paper. However, the principles discussed in Section 3 are generally applicable to all phases of the mining cycle.

Section 4 addresses a specific aspect of governance, namely processes for making decisions regarding permitting and conditions under which mining/extraction activities may or may not proceed. In this section, a recent decision within the mining sector is reviewed in order to highlight relevant learning points.

Section 5 summarizes some of the activities that the wetlands sector can consider that may facilitate a higher degree of participation in activities that may impact wetland sites.

2 Economic trends in the mineral industry

At the moment, the mining industry world-wide has moved from a period of low-demand and low-revenue into a cycle of increased demand, increased competition for scarce resources, and higher commodity prices. Declining commodity prices in the 1990s resulted in a lack of exploration and development, which combined with the industrial growth of China and India has led to rapidly increased build-up of mining activity. As revenues increase it then becomes possible to exploit previously uneconomic resources. Lead is a good example – long neglected in terms of exploration, there are currently no surplus lead stocks held in the US, and world-wide shortages are creating a demand for increased exploration and mining. In addition, there is currently a world-wide shortage in refinery and smelter capacity, further increasing commodity prices. Typically, a “boom-to-bust” commodity cycle will last around seven years; indications are that the current boom may continue for considerably longer.

The worldwide mineral exploration budget for 2006 was USD7 billion, distributed as follows (Metals Economics Group, 2006):-

AREA	PERCENTAGE OF TOTAL INVESTMENT BUDGET
Pacific/SE Asia	4%
Latin America	24%
Canada	19%
Africa	16%
Australia	11%
United States	8%
Rest of World	18%

Of the 2006 exploration total, 18% was associated with existing operations, 39% with grassroots exploration, and 43% with late stage exploration. Current exploration activities are becoming more and more mature, with the majority of projects now reaching the pre-feasibility stage. A large number of projects are therefore set to become operating mines in the immediate future.

It is widely acknowledged within the mining and petroleum industries that there is limited potential for the discovery of new large-scale “world-class” high-grade deposits. Therefore the industry is moving towards the discovery and exploitation of marginal resources. “Marginal” resources include the following categories:-

- High-grade small-scale deposits;
- Low-grade large-scale deposits;
- Low-grade small-scale deposits;
- Technically complex deposits;
- High risk operations.

High-grade small-scale deposits generally have a short lifetime, but may have high start-up costs. A priority target within the industry, there is increased financial pressure world-wide to locate and exploit this category of resource as quickly as possible, at minimal cost.

Low-grade large-scale deposits are normally exploitable only by major companies and generally require extensive capital investment in order to exploit economies-of-scale.

Low grade small-scale deposits are typically exploited by smaller mining companies or artisanal (informal) miners. In order to remain profitable, exploitation of these deposits requires that costs be reduced to an absolute minimum – including associated environmental protection, mitigation and closure costs.

Technically complex deposits include those resources that require a higher investment in technology. Examples include marginal petroleum fields that can be exploited through the use of more invasive technology, or improved metallurgical technology that provides for a more efficient recovery of the commodity from the host rock, at a higher cost. Technically complex resources also includes those deposits that generate a higher environmental impact during exploitation; i.e. sulphide deposits with a high acid content, requiring the design, operation and maintenance of long-term tailings retention facilities.

High risk operations include those that were previously considered uneconomic due to remote location, political instability or lack of infrastructure. High commodity prices have to a large degree reduced the overall risk to the point where exploration and mining are no longer limited by these considerations.

Higher commodity prices and increased demand will therefore be offset by the need to exploit marginal resources. It can also be expected that there will be a concomitant trend in the mining industry towards minimizing associated costs and long-term social and environmental investments.

As commodity prices continue to rise, newer technologies will be utilized to extract previously marginal resources. Given the accelerated timeline discussed above, there will be limited time for site-specific assessments of the impacts of the newer technologies in any particular mining project. Strategic environmental assessments of newer technologies prior to their implementation would provide a knowledge base to improve the abilities of environmental regulators to assess the longer term impacts of a mining operation that utilizes these newer technologies.

The overall trend in the immediate future will therefore be to locate and exploit previously marginal or uneconomic resources, while keeping costs at a minimum in order to maximize the profit of the operation – and all within a much more compressed timescale. This will hold true regardless of whether the operator is a major international mining conglomerate, a local operator or a single artisanal miner.

3 Ensuring wetland ecosystems are adequately addressed in decision making processes – building the information base

3.1 Identifying and prioritizing information needs

In order to have good information to contribute to decision-making processes related to new mining/extraction projects, the wetlands sector needs to:

- Understand when and where mining exploration and production activities are likely to occur or are already occurring, and the potential nature of the impacts (since impacts will vary depending on the occurrence and geology of the mineral/commodity deposits and the extraction technologies to be used);
- In response to likely mining activities, prioritize programs for wetland inventory, assessment and valuation;
- Get educated on technologies proposed for use in new mining projects (accessing guidance on best practices for current mining methods and technologies, likely impacts of new/emerging technologies, new restoration technologies/approaches).

3.2 Information needs for different situations

There are several different kinds of situations within which scientific and technical information and expertise will be needed, depending on which phase of the mining cycle a project is in:

- Historical (up to several hundred years before present) or present-day mining activities, that are currently in late production/closure, post-closure or post-handover phases, and where there were or are long-term environmental impacts, whether mitigation and restoration were addressed in licensing or not. This might be principally a restoration issue, and there may be sufficient guidance and best practice material available in the wetland restoration literature, though it may require review for specific relevance to wetland ecosystems.
- Mining/extraction projects in commissioning or early production phases, where there might still be some limited scope for mitigation of existing and future impacts, depending on the conditions at individual sites, and hence for provision of some technical and scientific guidance perhaps through a field advisory mission. However, some of these situations are possibly already the subject of advocacy initiatives by external groups.
- Mining/extraction projects in late exploration phase, meaning that a license application will probably arise in the near future, since once a project has got to late exploration, it is very likely to proceed to production. However, the time taken to enter the production phase will vary depending on the economic and regulatory environment for the commodity and country in question. In these situations, appropriate scientific guidance might comprise:
 - guidance on potential restoration and mitigation options associated with the project;
 - guidance on the potential impacts of technologies proposed for use in the project;
 - early identification of areas with high potential for near-term mining/extraction development, in order to provide longer lead times for EIA processes and studies, where there are wetland ecosystems in the neighborhood or region that could potentially be impacted by such development.
- Mining/extraction projects in the early exploration phase may allow somewhat longer lead time for inventory and baseline studies. In these situations, appropriate guidance might comprise:
 - identification of areas with potential for medium-term mining/extraction development, where such development could potentially impact on wetland ecosystems;
 - support for inventory efforts and baseline ecological studies, prior to any mining license applications actually being received.

3.3 Identification of potential future mining/extraction impacts

Current and recent exploration activities are a good indicator of the likelihood of new mining or extraction projects being proposed in the future. In some countries, the wetlands sector might be easily able to access such information and use this to identify potential future pressures on specific wetlands, before the permit applications for individual projects and associated EIA processes (if any) commence. Typically, such information might be generated through Strategic Environmental Assessment (SEA) initiatives if a national government undertakes such an initiative. However, in many countries, this kind of information on exploration-stage activities might not be easily accessible to wetlands managers at site or sectoral level, unless they take proactive steps in requesting the information or even generating it themselves.

The information to conduct such an assessment is readily available within the mining industry, since almost all exploration and production activities in the world are publicly reported, either through governments or through securities exchanges. One needs to know where to find the information, and how to interpret it from a database of reported exploration projects, and then how to use this to indicate the likelihood of actual mining production plus the nature of the impacts depending on the regional geology, mining processes and extraction technologies.

3.4 "Best-practice" guidance and case studies related to impacts of mining/extraction

It is usually helpful when participating in any permitting or decision-making process to have credible scientific information and guidance available for identifying, assessing, mitigating and/or preventing impacts on wetland ecosystems of mining/extraction activities, including exploration, commissioning, production, closure and post-closure phases. There are two sorts of scientific information that might be needed:

- Guidance for "business as usual" mining/extraction activities being carried out with technologies currently in use: this would entail a review of available guidance and literature, highlighting that which provides good technical detail, especially on the production and closure phases.
- Guidance for emerging technologies or technologies not previously economically feasible but likely to be applied in the future. This is more challenging, since most of these emerging technologies have not been applied at full scale, and only some have proceeded beyond bench to pilot scale. The recommendation here would be to ask a suitably qualified person or team to conduct a strategic review of these newer/emerging technologies, to provide a qualitative assessment of their potential impacts on wetland ecosystems in the field.

4 Ensuring wetland ecosystems are adequately addressed in decision making processes – an example.

In this section we present an example of a recent decision-making process that illustrates the value of systems that are transparent and that allow information on the value of wetland ecosystem services, and the potential costs of loss of those services, to be explicitly factored into cost-benefit analyses related to all phases of mining/extraction projects.

4.1 Kemess North Joint Review Panel report

A recent decision in British Columbia, Canada, regarding the environmental impacts of the proposed Kemess North copper/gold operation has potentially significant implications for the definition of “sustainability” of mining activities in Canada, and for the long-term post-closure liability of mining companies in Canada. The decision was based on recommendations arising from an independent review by a specially-appointed Joint Review Panel, who recently published their report on the findings of the Kemess North EIA (Kemess North JRP, 2007).

Of interest in this case is the panel’s view that the post-closure phase for the Kemess North project will be several hundred years’ in duration, until the water quality impacts will no longer require some form of active mitigation involving storage, treatment and safe disposal of mining wastes. The panel questioned the likelihood that the mining company would be around for post-closure phase lasting up to one thousand years, since the economic life of the mine is relatively short (eleven or so years). The panel also observed that any future unforeseen costs of mitigation and/or cleanup would then fall to the state (i.e. the public) once the mining company has met its post-closure obligations. The Joint Review Panel notes that the costs of production, post-closure site management and loss of ecosystem services (notably the spiritual value of an associated freshwater lake) are not easily quantifiable in dollar terms, thus placing in doubt the overall economic benefit to society of the project.

The Joint Review Panel report also provides a set of “sustainability perspectives” that were used as the basis for their recommendations on the Kemess North project. These represent a possible basis for sustainability evaluation criteria for mining generally, and are useful starting points for identifying the kinds of wetland-related information that might be needed as input to a transparent and balanced decision-making process. These sustainability perspectives are briefly described below.

- Environmental Stewardship i.e. the degree to which potential adverse environmental impacts are mitigated and compensated throughout all phases of the project, including post-closure;
- Economic Benefits and Costs i.e. the degree to which a fair balance is achieved between short term benefits and long term costs, even where some aspects cannot readily be priced in dollar terms;

- Social and Cultural Benefits and Costs i.e. the degree to which the project contributes to social wellbeing and community stability in affected communities, particularly if the project will result in loss of ecosystem services currently important to resident communities;
- Fair distribution of Benefits and Costs i.e. the degree to which the costs and benefits of the project are fairly distributed amongst project proponents and affected stakeholders;
- Present versus Future Generations i.e. the potential for the project to create a “long-term legacy of substantial minesite management and maintenance obligations” and the degree to which these obligations are passed on to future generations.

5 Concluding remarks

5.1 Key messages for the wetlands sector:

5.1.1 Provide information to ensure consideration of the full range of wetland ecosystem services in decision making

Valuation of the full range of wetland ecosystem services must be incorporated into decision-making processes, both within the mining sector and in independent/external EIA processes, in order to fully assess long term costs and benefits and the distribution of those costs and benefits. It is of particular importance to be able to quantify the costs of remediation, mitigation and restoration in the post-handover phase, since these costs would probably have to be borne by the public.

5.1.2 Catch up with economic drivers in mining sector

The wetlands sector shouldn't get left behind or left out of decision making processes, especially as timelines will get shorter for projects to move from exploration to production:

- Prioritize wetland inventory and baseline data collection activities for areas where potential for mining/extraction is high, in order to have good information available for SEA/EIA processes;
- Get educated, with credible scientific information related to mining technologies, potential impacts, mitigation and restoration options, long & short-term costs, in order to be prepared for EIA and license application processes.

5.1.3 Strengthen decision-making processes to address protection and wise use of wetlands in all phases of mining/extraction projects

- Strengthen national and transboundary governance systems to ensure:

- due process and proper attention to valuation of wetland ecosystem(s) services in the cost-benefit analysis (ecological, social, economic and cultural values) prior to permitting of mining/extraction activities
- Adequate enforcement and compliance with conditions of permits in all phases of mining/extraction activity
- Adequate attention to managing and implementing requirements of the post-closure and post-handover phases – assignment of responsibility, accountability
- Strengthen requirements for, and enforcement of, corporate social responsibility (CSR).

5.2 Interdependence between governance, CSR and scientific/technical information

- Even if good wetland inventory and baseline information is available, the governance system's decision-making processes must allow that information to be tabled and considered in an open and transparent manner.
- Even if a strong, transparent governance system exists, if the ecological information is lacking then cost-benefit analyses will not adequately take account of the potential value of wetland ecosystem services or the potential costs of losing those services. Subsequent decisions could be biased or flawed.
- Even if a strong, transparent governance system and good wetland information are in place, CSR is still a necessary (but not sufficient) factor for ensuring compliance while achieving the benefits and minimizing the costs of mining to society.

It may not be realistic to expect members of the corporate sector to fill a “governance gap” in a particular country, i.e. to rely solely on a corporate sense of social responsibility and self-regulation to compensate for a weak regulatory environment or a lack of environmental/ecological information. Nor is it realistic to expect the corporate sector to operate outside the proscribed legal requirements of a particular country or to oversee the distribution of the social benefits of mining. This is particularly challenging with respect to managing the activities of other members of the mining/extraction sector who do not subscribe to or comply with the sector's agreed CSR norms.

Any governance gap needs to be bridged by strong government and civil administration agencies, hence there is potentially a larger role for inter-governmental agencies to play in supporting and strengthening national governance systems, concurrently with ongoing global and regional CSR initiatives.

5.3 Capacity

Not all countries currently have adequate capacity to address the three issues of information, governance and CSR concurrently. To address this in the short to medium term, innovative strategies/partnerships for implementation and capacity-building should be considered. A more comprehensive approach could potentially incorporate the role of inter-governmental agencies in supporting and strengthening governance systems and processes, and the role of the corporate sector in promoting CSR, setting agreed minimum standards, promoting sectoral self-regulation and contributing to the information and knowledge bases.

6 References

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